The Possible Nature of Dark Energy and Dark Matter

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Abstract

The nature of dark matter is linked to the fluctuations of curvature of the hyper-surface of our three dimensional universe. These fluctuations of curvature have gravitational effects and deviate radiations. While we question dark energy, as another theory by Olivi-Tran [4] accounts for the acceleration of the expansion of our universe by analyzing the nature of time.

Keywords: dark matter; dark energy; nature of time

INTRODUCTION

I make here the hypothesis that our three dimensional universe with physical laws is embedded in a four-dimensional space where no physical law exist [1, 2]. Time is a function of the radius of curvature of our universe and this leads to the acceleration of the expansion of our universe [4].

what is dark energy? what is dark matter?

A simple analysis regarding the fluctuations of the hyper-surface of our universe leads to the nature of dark matter. Dark energy may only be an artifact of calculation.

SIMPLE NATURE OF DARK ENERGY

In astronomy and cosmology, dark matter [6] is a type of matter hypothesized to account for a large part of the total mass in the universe. Dark matter cannot be seen directly with telescopes; evidently it neither emits nor absorbs light or other electromagnetic radiation at any significant level [7]. Instead, its existence and properties are inferred from its gravitational effects on visible matter, radiation, and the large scale structure of the universe. Dark matter is estimated to constitute 84% of the matter in the universe and 23% of the mass-energy.

Dark matter came to the attention of astrophysicists due to discrepancies between the mass of large astronomical objects determined from their gravitational effects, and mass calculated from the "luminous matter" they contain; such as stars, gas and dust. Subsequently, other observations have indicated the presence of dark matter in the universe, including the rotational speeds of galaxies, gravitational lensing of background objects by galaxy clusters, and the temperature distribution of hot gas in galaxies and clusters of galaxies.

The model of dark matter that I present here is based on the fluctuations of the hyper-surface of our universe. Our universe is three dimensional and curved, therefore it may be embedded in a four dimensional space with no curvature. The hyper-surface of our universe is superimposed to our present universe. But this hyper-surface is not 'smooth', this means that it may contain fluctuations. These fluctuations are due to real matter (due to the changes of curvature due to gravitation) but also to dark matter (or at least 'are' dark matter). Indeed, the local changes in the curvature of our universe may lead to what we call dark matter. This dark matter, although it is only a local deformation of the hyper-surface of our universe, may deviate radiations and can account for gravitational effects.

In mathematical terms, Heisenberg's uncertainty principle writes (which is only strictly valid if time $t = 0$ [1], i.e. outside our universe):

$$\Delta E \Delta t >= \hbar/2 \tag{1}$$

where E is the energy and t the time. At the boundaries of our universe, if we take the limit from outside to the boundaries, time is equal to zero. So equation (1) is valid. Therefore, E will grow to ∞; but at the very moment where the limit of the boundaries is reached, equation (1) is no more valid, t will be a function of the radius of curvature of the universe [1] and E will take a finite value. The fact that t takes locally a finite value but that this value is random leads to local deformations of the hyper-surface of our universe (i.e. of our universe itself, see above). These deformations evolve with the expansion of the universe, thus there are not real matter, they only have gravitational effects (due to curvature) and deviate radiations (which follow the curvature of our universe).

SIMPLE NATURE OF DARK ENERGY

In physical cosmology and astronomy, dark energy [8] is a hypothetical form of energy that permeates all of space and tends to accelerate the expansion of the universe [9]. Dark energy is the most accepted hypothesis to explain observations since the 1990s that indicate that the universe is expanding at an accelerating rate. In the standard model of cosmology, dark energy currently accounts for 73% of the total mass-energy of the universe.

I published previously an article (see Olivi-Tran [4]) that explained why the expansion of universe is accelerating. Indeed, in the first article of a series that I published [1–3], I demonstrated that time is a logarithmic function of the radius of curvature of the universe (which is three dimensional and curved, therefore embedded in a four dimensional space). The fact that time is linked to the radius of curvature of our universe leads to the fact that time t is a function of the fourth dimension of the space in which our universe is embedded. Due to all these facts and especially to the logarithmic evolution of time leads to a measured acceleration of the expansion of our universe. There is no need of a dark energy to explain this acceleration. For more details, read Olivi-Tran [4].

Indeed, time t may be written (see reference [1] for details of calculations):

$$t = \frac{1}{2H} \ln(\frac{k}{(-H^2 + \frac{8\pi G}{3}\rho + \frac{\Lambda}{3})}) \tag{2}$$

where G is the gravitational constant, ρ is the density (energy) of the fluid which increases [4], Λ is the cosmological constant, H the Hubble parameter.Because H is at square, time t increases but with a logarithmic behavior. Straightforwardly, in the four dimensional space defined above, distances may be absolute. As a consequence an absolute distance divided by a decelerating time t leads to an appearing acceleration of the expansion of universe.

CONCLUSION

I showed here that the fluctuations in the local radius of curvature of our universe (which are due to its expansion [1, 3]) have all the properties of dark matter: they lead to gravitational effects and they deviate radiations. While dark energy, in my opinion, is only an artifact of calculations in order to recover the acceleration of the expansion of our universe. Indeed, this last may be explained by the nature of time.

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